Put As, the radius of the great circle, = R; draw Ar perpendicular to aS, and because the angle ASa = 45°, rA is equal to rS.

$2rA^2 = R^2$

$$aA^2 = \frac{R^2}{2} + R\frac{R}{\sqrt{2}} = R^2 \times \left(2 - \sqrt{2}\right) =$$

$R^2 \times \cdot 5857864.$

Divide Sb at m, in the extreme and mean ratio, and join mE; then, according to the known properties of the pentagon, Sm = Em and the angle SEm is bisected by the line eg. ∴ Sg : Sm : : R : R + Sm, and Sm =

$$R\left(\frac{\sqrt{5}-1}{2}\right) - (Euclid's\ E.)$$

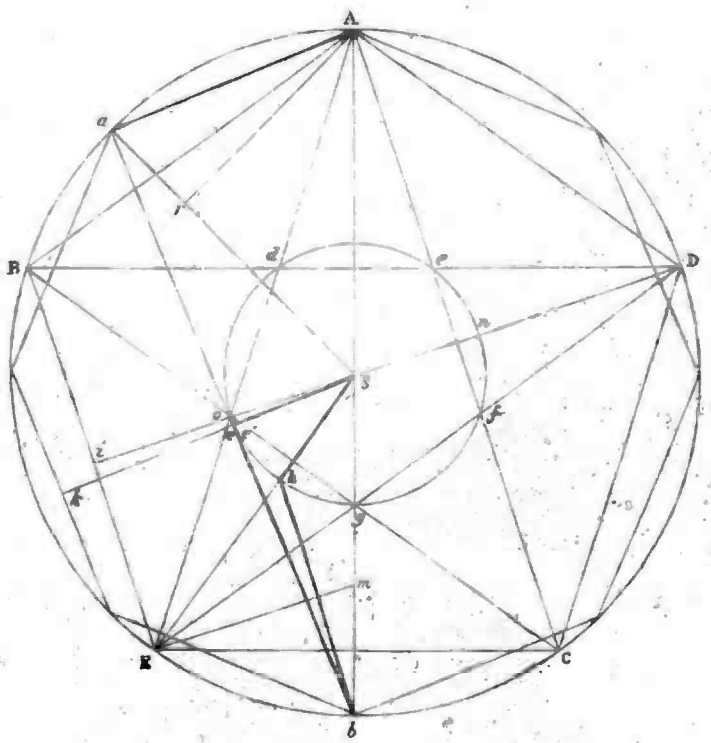
$$Sg = \frac{R^2(\sqrt{5}-1)}{R(\sqrt{5}+1)} = R \times \frac{(3-\sqrt{5})}{2}$$

$$\therefore Sg^2 = R^2 \times \frac{(7-3\sqrt{5})}{2}$$

and ∴ $on^2 = 2R^2 \times (7-3\sqrt{5}) = R^2 \times \cdot 583592$

Hence, since the expression $R^2 \times \cdot 585786$ is greater than $R^2 \times \cdot 583592$, it follows that aA is *greater* than the diameter on of the small circle.

A similar result is obtained trigonometrically.



PENTAGRAMMA.

Draw the lines ab and bh, and Se perpendicular to ab, then will the proportion which the side Sh, of the triangle Shb, has to the side Se, of the triangle Scb, determine the relation between aA and on.

Put the radius, or the equal sides of the triangles = 10; then

as the sin. ∠ Seb, or 90° log.	10·000000	
to the side Sb, or 10 log.	1·000000	
so is the sin. ∠ Sbc, or 22½° log.	9·582840	
to the side Sc 3·827, nearly,	582840	
And		
as the sin. ∠ Shb, or 54° log.	9·907958	
to the side Sb, or 10 log.	1·000000	
so is the sin. ∠ Sbh, or 18° log.	9·489983	
to the side Sh 3·820 nearly,	·582024	

Hence the side of the octagon Aa is to the diameter of the small circle on—

As 3·827 is to 3·820 nearly, the diameter of the large circle being 10.

THE MEASUREMENT OF ARTIFICERS' WORK.*

In younger days we spent a good year in measuring all sorts of artificers' work, making out the accounts and examining into prices: from early morn till late in the evening we scrubbed away at this, and so far from ever having had occasion to regret the time thus spent, consider that it was most advantageously passed, and have found reason to congratulate ourselves upon it. Builders' work was more generally measured then than it is now (although not *many* years ago either), the custom of contracting having mainly superseded it, and, if the truth is to be told, not before it was desirable. "Measure and value" had been turned into "measure and what you can make it come to;" the system was a bad one and destroyed itself. Sad boys, too, were some of those old surveyors: settling what the *dinner* should be and where, as the first duty of the day, and eating it as the last. What stories could we tell, if they would tend to good, of some of the Government measurements under a schedule of prices,—of a kitchen, for example, which was measured and paid for only four times, or of a Government officer who would say to the builder's surveyor on a hot day,—"Now, my good fellow, you can do this as well without me as with me, so I'll go and sit down at —— till dinner-time,"—but, no; peace be to the memory of those times: they have passed away never to return. Let them sleep.

A knowledge of architectural mensuration is still, however, desirable, as this must always be practised to a considerable extent, and Mr. Reid's work, just now published, will be found very useful in acquiring it: it includes, too, instructions for making out bills of quantities for estimates, illustrated and simplified by plans, sections, and details. He has taken a first-rate building, in conformity with the "act," and given the specification, plans, &c., "and the entire admeasurement of the parts thereof, in accordance with the *most minute* and customary methods at present adopted by all the eminent measurers of the day; explaining, also, the mode of taking the dimensions and working them out, abstracting and completing the bills of quantities; to each item of which is affixed the prime-cost value, calculated according to the current prices of materials and labour:" it is a veritable dimension-book and bill-book in print, with annotations and additions.

Our author says he has adopted "the most *minute* methods" adopted by measurers. It is just this extreme minuteness and separation of the work on one article, which has made "measure and value" and "a fair price" convey two different meanings. Sound as the mode may be in theory, when we take a morsel of stone, for example, and first measure the stone itself, as stone, and then take the sawing upon it, and then a plain bed, and then the plain work that is rubbed, and then the sunk work, and then a throat under the lower edge, and then a chamfer to the top edge, and then a mitre, and wind up with two or three mortice-holes for iron bars, and then price all these separate processes at the fairest possible approximation to the cost of each when alone,—we find, although perhaps we are only dealing with pence, that the sum total comes out, as might be expected, something more than the thing itself, as a whole, can be produced for; and when this same process goes on all through a building, the difference becomes considerable. This, however, belongs to the system, and not to our author, who appears to have executed his task in a very satisfactory manner. This work will scarcely make a surveyor by itself; actual practice and information obtained on the spot, are necessary for that; but it will do much in shewing the student how he may become one, and will otherwise shorten the road very considerably.

* The Young Surveyor's Preceptor: a comprehensive analysis of the art of architectural mensuration: being a familiar practical system by which the student may teach himself to ascertain the dimensions, quantities, and value of builders' work. By John Reid, Surveyor. Basevi: Drake-street, Red Lion-street.

CIVIL ENGINEERS' COLLEGE AT PUTNEY.

On Tuesday last the annual meeting was held for the presentation of prizes awarded to students in "Putney College for civil engineering and general practical and scientific education." The president, the Duke of Buccleuch, who was in the chair, called upon the Principal and the professors *seriatim* to make their reports, from which it appeared that they had reason to be satisfied with the improvement in the state of the college, both educationally and morally. The Rev. Morgan Cowie, the very active Principal, in the course of his statement, regretted that their standard in *mathematics* was not so high as it should be. This is greatly to be regretted, and if the remedy in any degree rest with the council, should forthwith be attended to:—this failing is of the most serious import.

Dr. Lyon Playfair, in his report, said the course there on chemistry and physics was the most extensive of that in any college he knew, consisting of 200 lectures. It had usually occupied two years, which was a disadvantage, but they had now obtained the assistance of Mr. J. A. Philips, and should be able to get through it in shorter time.—Professor Ranger spoke very encouragingly of the proceedings of his classes, and said the replies to the examination papers by many of the students were beyond his expectations.* They had not visited so many buildings as on previous occasions, but the failures on the Richmond line, which had been numerous, had afforded them sufficient matter for inquiry!

The president, in addressing the meeting, and congratulating the committee on the progress that had been made, dwelt upon the importance of gentlemanly conduct on the part of the students.—His royal highness, the Duke of Cambridge, who took much interest in the proceedings, as well as in some interesting experiments with the electro-magnet which followed, urged, that without good principles, learning was of no use.—The Bishop of London made an admirable address, pointing out, in the course of it, that the union of religious instruction with scientific training was only to be found in England, and that we were now reaping the benefit of it. The reward for good conduct, conduct based on religious feeling, was temporal as well as eternal; it was a matter of course that, other things being equal, men would rather trust large and important works to one for whose consistent and good behaviour there was a sound assurance, than to one of contrary reputation and habits. He could not avoid contrasting, most favourably for England, the conduct of the pupils of the *Ecole Polytechnique* and other foreign public seminaries in times of political excitement and tumult, with that of the students at Putney and elsewhere, who, when the peace of the metropolis was threatened, at once volunteered in defence of order.

Sir Charles Pasley afterwards addressed the meeting, and said, that being asked some time

* These papers, so far as relate to architecture, we will find an opportunity to print, as they are suggestive of objects for study, and useful for self-examination.

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